MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday February 1, 1994.

Action Items:

73. Complete the MODIS brochure and released for printing. Assigned to Bauernschub 10/18/93. Due 11/15/93.

74. Prepare and submit a Configuration Change Request which revises the definition and impact of levels of software criticality for the MODIS Software Management Requirements Document. Assigned to Anderson 10/26/93. Due 12/ 1/93

75. Determine if the four electronic module boxes can be individually thermal tested in air, or must the thermal testing be done in a vacuum. Assigned to Silva 10/26/93. Due 11/ 9/93

82. Work with the MODIS team to obtain a consensus on a revised MODIS crosstalk specification and provide inputs for a Configuration Change Request. Assigned to Ed Knight 12/14/93. Due 1/11/94 Tabled on 2/ 1/94 until 8/ 1/94

The following items were distributed:

1) Weekly Status Report #123
2) SBRC Memos submission from week #115
3) Minutes of the previous team meeting

Attendees:

✓ Dick Weber	Bruce Guenther	June Tveekrem
✓ John Bauernschub	✓ George Daelemans	✓ Bob Martineau
Rosemary Vail	John Barker	✓ Bob Silva
Lisa Shears	Joann Harnden	Ken Brown
✓ Mike Roberto	Patricia Weir	✓ Robert Kiwak
✓ Nelson Ferragut	✓ Mitch Davis	Harvey Safren
✓ Gene Waluschka	Jack Ellis	✓ Ed Knight
Kate Forrest	✓ Ken Anderson	✓ Harry Montgomery
✓ Bill Barnes	Rick Sabatino	✓ Marvin Maxwell
Les Thompson	✓ Cherie Congedo	Bill Mocarsky

MODIS Team Meeting and Other Topics 1 February 94

General

CDR packages mailed to GSFC from SBRC are available from, Stephanie Gorman in building 16W, room N115.

Team meetings were not held on January 18th or January 25th because of the CDR and Characterization and Calibration telecon respectively.

Trip to Orbit

Bob Martineau, Les Thompson, Mitch Davis, and Bob Silva visited Orbit Semiconductor with SBRC personnel on Monday, January 17th, to obtain an idea about Orbit's ability to provide the MODIS readout integrated circuits.

Mitch summarized the Orbit trip in a telemail message on January 25th. Mitch believes that it is very important for SBRC to provide Orbit with the necessary circuit parameters and hybrid schematics. Also, it is extremely important for Ken Shamordola, the SAM design engineer to communicate with Orbit.

Bob Martineau summarized the trip in a telemail message on February 3rd. Bob was surprised with the size of the Orbit effort and the number of changes required to bring the present readout design and requirements into conformity with the Orbit design rules and processes. The indium bump bonding was done by HTC and will now be done by SBRC. HTC did cryoprobing of readouts; SBRC will do ambient probing. Bob believes Orbit is a competent foundry. However, SBRC will be responsible for design layout, circuit simulation, design of the foresight process/design verification lots, for parameter extraction, and for all backend processing and product testing. Bob believes this will be a big job for SBRC and a success oriented schedule is unrealistic.

MODIS Critical Design Review

The closing of BWI due to snow, ice and icicles on the plane, and a simultaneous 6.6 level earthquake in LA failed to keep the MODIS team from going to California for the CDR.

SBRC personnel did an excellent job describing the technical status of MODIS. Time restrictions limited some of the details. The lack of readily available detailed electronic circuit diagrams from each type of detector to the digital signal output to the spacecraft was a problem. This information will be provided soon to the review team. One recommendation from the MODIS team is to provide backup view graphs with details, as needed, at the end of each view graph book. These view graphs would not be discussed in the review, but would be available for study after the review.

Comments from the MODIS team are being compiled.

Video Teleconference:

1) Spectroradiometric Calibration and Characterization Test Configurations

2) Data Reduction Algorithms

3) Test Analysis Controller Software

A video telecon was held with SBRC on Tuesday, January 25th. The presenters were Jim Young, Tom Pagano, and John A. Leonard. There were 100 pages of view graphs. Tom Pagano compiled a list of questions and comments following the telecon. GSFC is process of determining if additional questions or comments needed.

Focal Plane Assemblies

Bob Martineau mentioned that lot 3 of the Read Out Integrated Circuits (ROICs) were undergoing functional tests this week. A report from Pete Jemerson indicates initial functional tests of the ROICs for each of the four device types (VIS, NIR, S/MWIR, LWIR PV) show no problems. The thresholds look good.

Lot#4 of the ROICs has a couple of leans against it. The dose of ion implantation is higher than called for by 1/4. Part of lot#4 has metal overetch (10 minutes rather than 5 minutes).

The third S/MWIR SCA failed at 100 thermal cycles due to indium bump separations. The chip is very large and one solution may be dicing the chip to subarrays. Bob suggested that increasing the height of the indium bumps may be another solution to consider.

There have been at least a couple of problems with the filter alignments on FPAs. The mask to bezel alignment of the NIR was off by 10 mils. This was determined after it was mounted to the FPA. A 2 mil mask to bezel misalignment was found for the S/MWIR before mounting the bezel on its FPA

One of four lot#2 PC wafers had the wrong metal deposited. The metal was stripped off and the proper metal put down. This wafer now has a lean on it.

Mechanics

A meeting on the kinematic mounts was held on January 26th. Attendees included Carl Faust of MMAS , Dick Weber, Kevin Grady, Bob Kiwak, Ken Anderson, Nelson Ferragut, Tom Venator, Mike Roberto, and Don Lokerson Carl discussed a preliminary memo from S. Raymus, EOS-STR-378, written 21 January 1994. MMAS concludes that the failure encountered was due to overtest and the EOS kinematic mounts are safe and ready to be used in instrument testing. This is based on a detailed stress analysis of the failed 2-axis mount, a fatigue cycle analysis, and a successful vibration test using the revised plan.

Nelson Ferragut is concerned about the kinematic mounts for MODIS. From Peterson's book, "Stress Concentration Factors for Structures and Machine Elements", Nelson has preliminary indications are that the stress concentration factor for KM2 may be in the range from about 2 to about 3.8. This could cause some of the stress levels to go substantially above ultimate. Changes in the radius of curvature at stress concentration points might help to alleviate the problem. Also, a fracture control plan may be needed for these mounts. Finally, we need to have a high degree of confidence that these mounts are not even near being marginal for MODIS. Nelson plans to work with Mike Barthelmy of code 300 to work on GSFC analysis of the kinematic mounts to determine if his preliminary concerns are confirmed by analysis. SBRC is also doing analysis on the kinematic mount designs. Nelson has documented his concerns in a telemail message dated 1 February at 12:02pm.

Nelson provided copies of his report and stress concentration factor curves to Carl Faust and Tom Venator on February 3rd.

SBRC will be looking at shear out with regard to structural analysis. Shear out may occur before tear out.

Quality Assurance

Bob Silva mentioned that one or more ROICs are at GSFC for destructive analysis. Code 300 is waiting for the report from Turner Engineering.

Optics

Our contractor is completing a tolerance analysis. Gene Waluschka will be looking into stray light analyses, a thermal sensitivity analysis of the SRCA (possibly followed by a STOP analysis, if needed), and optical analyses for the various ground and flight calibrators.

Thermal

George Daelemans is working on a thermal analysis of the SRCA.

George will be looking into the heating effects on the radiative cooler if the spacecraft is maneuvered for a lunar MODIS calibration. He will also look at the amount of time it will take to get the radiative cooler back to nominal.

Testing of Electronics Boxes in Thermal Vacuum

Discussions are underway with SBRC concerning thermal vacuum testing of the MODIS electronics boxes at the box level. SBRC and GSFC personnel are in agreement that a cost-effective proof-of-design test should be conducted at the box level in thermal vacuum.

George Daelemans, Mitch Davis, and Mike Roberto met with Dick Julian for a splinter session during the CDR. We seem to all agree on testing the boxes in thermal vacuum. Mitch and George prepared writeups which were faxed to Julian on January 31st. Dick Julian faxed his memo on thermal vacuum testing at the box level to GSFC on January 31st. At this time, we are interested to see if Julian is in agreement with the GSFC writeups of our verbal discussions. One addition to the GSFC list by Bob Silva is that we recommend that at least one set of flight model electronics boxes would need to be tested in thermal vacuum.

Systems Telecon

This was held on Monday, January 31st. Attendees at GSFC were Bill Barnes, Harry Montgomery, Ed Knight, and Mike Roberto. Jim Young, Tom Pagano, Neil Therrien, etc. were at SBRC.

SBRC will be doing nothing about Quartz Crystal Microbalances (QCMs) or Angular Displacement Sensors (ADSs) unless asked by GSFC.

The GSE software acceptance reviews will be in May.

The effect of lunar view on radiative cooler performance needs to be determined. We will determine if our GSFC MODIS team can accomplish this work. MODIS would need to look at the moon for only a small amount of an orbit.

There is a five minute warm-up for the SDSM. Ed Knight would like to know why this is required.

There may be earth shine on the solar diffuser viewport. There is the possibility of the light scattering off the SRCA fold mirror. Baffles may be added to prevent this problem.

Cold Focal Plane Alignment

A conversation on aligning the cold focal planes was held with Gordon Plews on February 1st. The cold focal planes are mounted under ambient conditions. These focal planes are cooled using the bench test cooler. The objective assemblies are then adjusted so that the focus and alignment are correct with these focal planes cold. The objective assemblies are then pinned.

STOP Analysis

Cherie Congedo and Wayne Pierre of SBRC have worked to resolve differences in predicted NASTRAN results of the Structural Thermal OPtical (STOP) analysis results. The two NASTRAN models are now in agreement. Models are in the process of being checked.

Mike Roberto February 4, 1994